

REMARKS

In paragraph 1 of the Office Action, it was noted that the Examiner approved the proposed drawing correction filed on May 14, 2004. Accordingly, a corrected drawing of Figure 1 reflecting the proposed changes is being submitted herewith.

Claims 1, 3-5, 7 and 9-11 remain in this application. Claims 2, 6, 8 and 12 were previously canceled.

In the Office Action dated July 28, 2004, the Examiner rejected, in particular, independent claims 1 and 7 of the present application under 35 U.S.C. §103(a) as being unpatentable over Takami et al. (IEEE ICASSP 1992), in view of Hwang et al. (U.S. Patent No. 6,141,641) and further in view of Bub et al. (U.S. Patent No. 6,460,017). For the following reasons, Applicants respectfully submit that the claims of the present application are patentable over the art of record and respectfully request that the rejections be withdrawn.

Applicants respectfully submit that the Examiner's attention be directed to step d in both independent claims 1 and 7. Using claim 1 as an example, such element reads "adapting the probability density function by modifying the vocabulary by splitting the probability density function into a first probability density function and into a second probability density function if a drop of an entropy value is below a predetermined threshold..." With respect to this element, the Examiner stated that the Hwang reference "teaches the modification of the code book based on the use of entropy as a measure (Col. 8, lines 29-40). Entropy gives the uncertainty in a prediction of a statistical event. Hwang et al. uses it to determine the likelihood of generating data aligned to an output distribution (Col. 10, line 8)." The Examiner then reasoned that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Takami with the use of entropy for the splitting of the probability density function as taught by Hwang in order to efficiently provide new regions in the feature space that provided and proved speech recognition.

Applicants respectfully submit that there is a fundamental flaw in this reasoning. Indeed, the Hwang reference is directed to a system for recognizing speech based on an input data stream. The system includes an acoustic model which has a model size. The model size is adjustable to a desired size based on characteristics of a computer on which the recognition system is run. In one embodiment, in which an acoustic model is based on continuous hidden

Markov models, and wherein senones are represented by Gaussian density functions, both means and co-variances for the Gaussian density functions are combined. See, e.g., Col. 4, lines 11-26 in the Hwang reference. Even referring to the passage cited by the Examiner (Col. 8, lines 29-40), it is disclosed that “the m Gaussians in each decedent senone are combined into a smaller number of Gaussians in order to reduce the overall number of parameters.” As a deciding criterion for the combination of such Gaussian probability density functions, Hwang discloses that an entropy value also may be used.

Applicants respectfully submit that such combining of Gaussian probability density functions is an altogether different process than the splitting of a probability density function into a first probability density function and into a second probability density function as per the claimed invention.

Pursuant to the inventive splitting of a probability density function with respect to the run time when an entropy value is situated below a specific threshold value, a hidden Markov model can be adjusted so that the speech recognition capacity is increased. Conversely, as already noted above, Hwang merely teaches an acoustic model which can be parameterized whereby the size of the model can be reduced by combining the Gaussian probability density functions.

Accordingly, Applicants respectfully submit that not only does the Hwang reference fail to teach or suggest this feature of the claimed invention, but also that one of ordinary skill in this field of art would never consider the teachings of Hwang as it clearly does not address the splitting of a probability density function into first and second probability density functions if a drop of an entropy value is below a predetermined threshold. Again, Hwang is only concerned with combining probability density functions so as to reduce the size of an associated acoustic model.

In light of the above, Applicants respectfully submit that independent claims 1 and 7 of the present application, as well as claims 3-5 and 9-11 which respectfully depend therefrom, are both novel and non-obvious over the art of record. Accordingly, Applicants respectfully request that a timely Notice of Allowance be issued in this case.

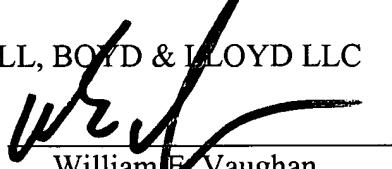
It is further acknowledged that a two month extension of time of \$450.00 is due in connection with this action at this time. However, if any additional fees are due in connection with this application as a whole, the Examiner is authorized to deduct such fees from deposit

account no. 02-1818. If such a deduction is made, please indicate the attorney docket no. (0112740-440) on the account statement.

Respectfully submitted,

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Dated: December 28, 2004

Amendments to the Drawings:

The attached sheet of drawings includes changes to Figure 1. Such corrected drawing is intended to replace the original sheet including Figure 1.

Attachment: Replacement Sheet